

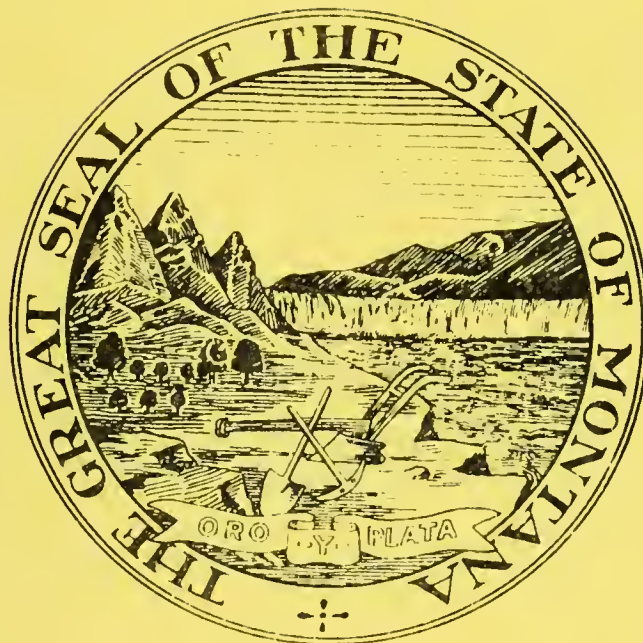
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STATE DOCUMENTS

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MONTANA ENERGY RESEARCH

SUMMER 1976



THOMAS L. JUDGE, GOVERNOR

MONTANA ENERGY ADVISORY COUNCIL

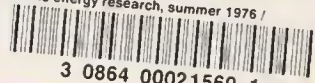
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MONTANA ENERGY RESEARCH

SUMMER 1976

Prepared By

Montana Energy Advisory Council Staff

James H. Nybo, Energy Research Coordinator
Kathy Albertsen van Hook, Research Aide

September, 1976

Much of the work underlying this report was supported by the United States Federal Energy Administration, for which we are appreciative.

Foreword

In 1976, one does not have to be an energy specialist in a government agency, an energy company, or a university to know that energy is an important issue -- here in Montana and in the world around us. As an issue, energy provides problems, responsibilities and opportunities for the State of Montana. It presents problems for our social and physical environment due to energy extraction and development, and also for our industrial and household consumers as energy prices rise and available supplies of some fossil hydrocarbons decline. With these problems come the responsibilities including reclaiming mined land, minimizing air pollution, and preventing and mitigating adverse socio-economic effects. Last, and perhaps most important, we are being given the opportunity to institute meaningful economic, environmental, and personal life style changes such as investing revenues earned from the exploitation of our nonrenewable fossil resources in renewable-based activities of lasting benefit, reducing our fantastic consumption of energy, and hastening the transition from a fossil-based energy system to one based on solar energy.

In order to deal effectively with the effects of fossil energy development, and to deal creatively with opportunities for the future, we must make good use of our technical and academic assets and capabilities. Among other things, this means research.

This report, Montana Energy Research, has been prepared to outline the interest and activities of the State of Montana in dealing with energy research, to describe the research information services available through the Montana Energy Advisory Council, to present a financial overview of research funding, and to present a current inventory of all ongoing energy-related research occurring in and for Montana.

We present this report with one hope -- that you will use it.



Bill Christiansen
Lieutenant Governor
September, 1976

Table of Contents

	<u>Page</u>
Foreword, Lieutenant Governor Bill Christiansen	i
MEAC's Energy Research Coordination Program	1
The Research Information System	2
Research Funding Breakdown, Fiscal Year 1976.	3
Air Quality/Meteorology	7
Alternative Sources	15
Biological (Fish, Vegetation & Wildlife).	17
Coal.	33
Economics	45
Energy Policy	51
Environmental Impact Statements	55
Geology & Soils	59
Governmental Studies.	63
Land (Use, Ownership & Reclamation)	67
Oil, Gas, Electricity & Uranium	79
Population/Demographic.	83
Resource Allocation	85
Sociological Studies.	89
Water Quality	93
Water Use/Supply.	101

Montana Energy Advisory Council's Energy Research Coordination Program

The Montana Energy Advisory Council (MEAC) has lead responsibility within state government for the coordination of funded energy-related research efforts.

In the past year a major effort in energy research coordination has been the complete restructuring of the energy research matrix board which is used to track ongoing and proposed energy research in or for Montana. This system supports the needs of MEAC and state government in knowing current research activities. After a meeting in July of 1975 on research in the Colstrip area, MEAC published a summary of projects in the area which included 89 listings. MEAC cooperates with the Old West Regional Commission's automated Energy Research Information System, feeding information on Montana projects into the system. During the past year, MEAC has organized a research utilization workshop for state employees at the Montana State Library, held information/coordination sessions for state and university personnel on regional energy/environmental studies, energy demand studies, our matrix board system and energy research needs.

The Montana Energy Advisory Council has made a conscious attempt to forge relationships with various federal research establishments, including the Energy Research and Development Administration (ERDA), the National Science Foundation (NSF), the Environmental Protection Agency (EPA), the Federal Energy Administration (FEA), and others, as well as our own academic research community. We have worked closely at the interface between many ongoing projects and potential research users and contributors in a broad range of energy, environmental and economic areas. Some specific research-related efforts of the state have included staff participation with the Governor's Gasification Task Force, the Citizens' Advisory Committee on Energy and the overall energy policy project assigned to MEAC by Governor Judge.

The chief purpose of this project is to see that research results are made available to state government planners and decision-makers in time and form that permit effective utilization, and that ongoing and proposed research is designed and carried out in their view with the benefit of their perspectives and needs. Of course, coordination alone cannot guarantee the accomplishment of this broad purpose. It can, however, remove obstacles to effective communication and provide research users with avenues of access to completed research, research in progress, and the process of formulating overall policies relating to research needs.

With major emphasis on the user, MEAC works toward the timely and effective use of energy research by serving as coordinator, communication facilitator and research information focal point. Related areas of concern include avoiding unnecessary duplication of effort, providing a reference to researchers and research funders and, of course, sharing available information with any interested persons.

The Research Information System

This publication lists every ongoing or recently completed energy research project of which we are aware. Information about projects which we may have missed would be greatly appreciated.

The research projects listed with a number preceeding the project title are also listed and abstracted in the Old West Regional Commission Energy Research Information System publications. Copies of these publications are available upon request from MEAC (406-449-2946) or from the Old West Regional Commission (406-245-6711 extension 6665) Fratt Building, Suite 306A, Billings, Montana 59101.

Those projects not included in the Old West System are abstracted in this publication.

Information about ongoing Montana energy research is organized for quick reference on a matrix board classified by performing agency (Federal, State, University and Private) and by subject: 1/

Energy Policy

Coal [conversion, new technologies]

Oil, Gas, Electricity, Uranium [transmission, exploration, new sources]

Alternative Sources [solar, wind, geothermal, small-scale hydro power]

Resource Allocation [energy conservation, fuel substitution]

Environmental Impact Statements [formal impact assessment]

Air Quality/Meteorology [baseline monitoring and impact of air pollution]

Geology and Soils

Land (Use, Ownership, Reclamation)

Water Quality [baseline monitoring and impact of degradation]

Water Use/Supply [allocation, diversion, water rights]

Biological (Fish, Vegetation, Wildlife)

Economic Studies [impacts on local economies]

Sociological Studies

Population/Demographic

Governmental Studies [impacts on local governments]

Miscellaneous

Each project has a 5" x 8" card on the matrix board that contains the following information:

Project Title
Principal Investigator
Lead Agency
Status
Funding
Time Frame
Sponsor
Abstract

1/ Brackets enclose descriptors not part of the matrix board heading.

Research covering more than one subject has sub-topic cards marked with a yellow band.

Listed on the back of the cards are any other subject headings under which the project is categorized.

Every research project included on the matrix board also has a file which contains a research reporting form and any material not included on the matrix card -- such as interim reports, correspondence, research proposals, and newspaper clippings.

When a research project is completed, the matrix card is removed from the board and placed in a "completed" file. Any publications resulting from the research are ordered for review by MEAC staff and then forwarded to the State Library, where they are available through library loan.

The matrix board is currently available in Room 102 of the Capitol Building. Also available in Room 102 is the Old West Regional Commission Energy Research Information System publication. On a regional basis, Old West's system serves a similar function to the matrix board. Several bibliographies are also available for review, including the Smithsonian Science Information Exchange printout of Montana energy research completed since 1973. We would like to become a repository for bibliographies on Montana or regional energy research with the goal of compiling a comprehensive energy bibliography for the state.

Research Funding Breakdown, Fiscal Year 1976

Tables I and II detail research funding for Fiscal Year 1976. The "Private" category includes private consultants and private research organizations such as the Montana Energy and MHD Research and Development Institute. The "State" category includes organizations such as the Yellowstone-Tongue Areawide Planning Organization. The "College" or "University" category includes some out-of-state universities conducting energy research in Montana.

The dollar totals should be considered "best estimates" of research funding, but these best estimates give important indications of funding trends. Federal agencies, including the Energy Research and Development Administration, the Environmental Protection Agency, the United States Geological Survey, and the Federal Energy Administration, granted over \$12.5 million to energy research in Montana. Over \$5 million of this went to colleges or universities. "Water Quality and Water Use/Supply" received over \$5 million for Fiscal Year 1976, the largest total for a single subject area.

Table 1
Research Funding Breakdown by Source
and Recipient, Fiscal Year 1976 */

<u>Grantors</u>	<u>Amount</u>
Federal Government	\$12,694,760
State	95,870
State and Federal Government	12,925
Industry	549,365
Industry and Federal Government	320,826
College or University	<u>75,791</u>
Total Granted	\$13,749,537
<u>Recipients</u>	
Federal Government	2,825,579
State	4,672,693
College or University	5,342,940
Industry	32,000
Private	<u>876,325 **/</u>
Total Received	<u>\$13,749,537</u>

*/ Includes several year-long projects that do not strictly fit the fiscal year time frame.

**/ Does not include \$1.15 million granted this year by the Energy Research and Development Administration for construction of the Magnetohydrodynamics (MHD) facility in Butte.

Table 2
Research Funding Received or Expended
By Subject Category for Fiscal Year 1976

Alternative Sources	\$ 32,364
Air Quality/Meteorology	937,831
Biological (Fish, Vegetation, Wildlife)	1,851,179
Coal	1,574,476
Economic Studies	528,443
Energy Policy	985,646
Environmental Impact Statements	74,125
Governmental Studies	218,531
Land (Use, Ownership, Reclamation)	1,846,274
Oil, Gas, Electricity, Uranium	20,664
Population/Demographic	42,000
Resource Allocation	122,543
Sociological Studies	417,187
Water Quality	1,651,136
Water Use/Supply	<u>3,447,138</u>
Total	<u>\$13,749,537</u>

Sources of Energy Research Information

University research offices.
Old West Regional Commission.
Individual researchers.
State agencies.
Federal agencies.
Smithsonian Science Information Exchange.
Oakridge National Laboratory Energy Information Center.
Montana congressional delegates.
Newspaper and newsletter articles.
Industry.

AIR QUALITY / METEOROLOGY

AIR QUALITY/METEOROLOGY

00000128

Project Title:

Ground-Level Measurements of Nuclei From Coal Development in Northern
Great Plains: Work Plans for Design of a Monitoring Program

Project Supervisor:

Briant L. Davis
South Dakota School of Mines and Technology
Rapid City, South Dakota 57701
(605) 394-2291

Time Frame:

2/15/75 to 6/30/76

00000146

Project Title:

Possibilities of Climate Modification by Large Power Plants

Investigators:

John D. Marwitz; W. A. Cooper; D. L. Veal

Project Supervisor:

Dr. D. L. Veal
Department of Atmospheric Science
University of Wyoming
University Station, Box 3038
Laramie, Wyoming 82071
(307) 766-3245

Time Frame:

6/1/75 to 11/30/76

00000152

Project Title:

Cost Benefit and Improved Fuel Use Through Time-Variable Atmospheric
Dispersion Potential: An Assessment in Relation to Pollution Control

Project Supervisor:

Glenn R. Hilst
TRC, 125 Silas Deane Highway
Weathersfield, Connecticut 06109

Time Frame:

6/1/75 to 5/31/76

00000162

Project Title:

Study and Monitoring of Fort Union Basin - Air Quality

Project Supervisor:

Dave Maughan

Montana Department of Health and Environmental Sciences

Cogswell Building

Helena, Montana 59601

Time Frame:

7/1/75 to 6/30/76

00000163

Project Title:

Pilot Balloon Observations in the Northern Great Plains

Temperature Soundings in the Northern Great Plains

Investigators:

Aeromet

P.O. Box FF

Norman, Oklahoma

Project Supervisor:

Western Scientific Services

328 Airpack Drive

Fort Collins, Colorado 80523

Time Frame:

6/1/75 to 7/1/76

00000165

Project Title:

Effects of SO₂ and Other Coal-Firing Plant Emissions on Producer, Invertebrate Consumer and Decomposer Structure and Function in an Eastern Montana Grassland

Investigators:

William K. Lauenroth; Robert Woodmansee

Project Supervisor:

J. L. Dodd

Natural Resource Ecological Laboratory

Colorado State University

Fort Collins, Colorado 80523

Time Frame:

4/1/74 to 4/1/78

00000166

Project Title:

Integrated Aerosol Characterization Monitoring - Colstrip, Montana

Investigators:

R. F. Pueschel; G. T. McNice

Project Supervisor:

V. E. Derr

U.S. National Oceanic & Atmospheric Administration

3100 Marine Avenue

Boulder, Colorado 80302

Time Frame:

5/1/75 to 12/31/76

00000167

Project Title:

Atmospheric Sciences: Potential of Energy Extraction and Conversion Processes in the Northern Great Plains for Sulfur, Fluorine, Heavy Metals Contamination in Terrestrial and Aquatic Ecosystems and Its Impact on Plant Community Productivity and Stability Including Secondary Effects on Animal Species in the Food Chain

Investigator:

Clarence C. Gordon

University of Montana

Missoula, Montana 59801

(406) 243-2671

Project Supervisor:

James J. O'Toole, Ph.D.

U.S. ERDA

Ames Laboratory

Ames, Iowa 50010

(515) 294-2500

Time Frame:

6/1/75 to Continuing

00000174

Project Title:

Air Quality Monitoring at Colstrip, Montana

Project Supervisor:

R. J. Labrie, Chief Engineer

The Montana Power Company

40 E. Broadway

Butte, Montana 59701

Time Frame:

1/1/72 to Continuing

00000347

Project Title:

Use of Lichens as Indicators and Predictors of Air Pollution Around
A Coal-Fired Power Plant

Project Supervisor:

Sharon Eversman
Biology Department
Montana State University
Bozeman, Montana 59715

Time Frame:

7/22/74 to 7/21/77

00000328

Project Title:

Air Pollution Potential and Baseline Air Quality for Amax Coal Develop-
ment in Montana

Investigators:

Ken Emerson

Project Supervisor:

James A. Heimbach, Jr.
Earth Science Department
Montana State University
Bozeman, Montana 59715

Time Frame:

3/1/75 to 11/1/76

Project Title:

Health Study Phase I & II

Investigator:

Dennis Haddow

Air Quality Bureau

Department of Health and Environmental Sciences

Capitol Station

Helena, Montana 59601

Time Frame:

// to 12/ /76

Descriptive Abstract:

Montana's respiratory disease rate is higher than the national average. This study will look at causes of and mortality from respiratory diseases in Montana, focusing on Silver Bow and Deer Lodge Counties. Causes will be related to existing industrial development. The potential impact of proposed energy development on respiratory disease will also be considered.

Project Title:

Physiological Responses of Vegetation to Coal-Fired Power Plant Emissions

Investigator:

David Tingey

Richard Field

Lucia Bard

National Ecological Research Lab

Environmental Protection Agency

Corvallis, Oregon

Time Frame:

6/ /74 to / /79

Descriptive Abstract:

This component of the coal-fired power plant project is designed to supply plant physiological support. This will be accomplished by (1) experimentally assessing the sensitivity of selected plant species to ozone, nitrogen dioxide alone, sulfur dioxide alone, and to mixtures of these three gases; (2) determining the influence of moisture stress on sensitivity and growth of native plants exposed to sulfur dioxide, nitrogen dioxide and to mixtures of these; and (3) measuring rates of uptake of SO₂ and NO₂ by the plants.

Project Title:

Investigations of the Effects of Coal-Fired Power Plant Emissions Upon Insects

Investigator:

Jerry J. Bromenshenk

University of Montana

Environmental Studies

Missoula, Montana 59801

Time Frame:

/ /74 to / /79

Descriptive Abstract:

The insect studies should contribute to an understanding of the plant-insect-fungal relations of both the grassland and forest ecosystems of Southeastern Montana. The information about responses of pollinators to air pollution stress should be invaluable to the other studies being conducted on plant diversity, plant productivity, and energy flow relations. This study contributes information about insect population trends, behavior and physiology, as well as following pathways of air pollutants through an insect system: honeybees.

Project Title:

Effects of Coal-Fired Power Plant Emissions on Vertebrate Animals in
Southeastern Montana

Investigators:

Robert A. Lewis
Martin L. Morton
Susan C. Jones
National Ecological Research Laboratory
U.S. Environmental Protection Agency

Time Frame:

/ /74 to / /79

Descriptive Abstract:

To address the overall goals of the Montana coal-fired power plant project we are attempting to identify: (a) those populations of birds and mammals in the study area that are most sensitive to air pollution; (b) those species, systems, and functions that may serve as specific, "noise-free" indicators of pollution; (c) population components that may serve as a measure of impact in the sense that they themselves are ecosystem resources or are coupled to ecosystem resources. We shall attempt to relate, if possible, functions of types (b) and (c) to evolve extrapolative or predictive models.

Project Title:

The Field Experimental Component: Evaluation of the Zonal Air Pollution System

Investigators:

Jeffrey Lee; Robert A. Lewis; Denis E. Body
National Ecological Research Lab
U.S. Environmental Protection Agency

Time Frame:

/ /75 to / /79

Descriptive Abstract:

These experiments are designed to test the effects of SO₂ upon plant and animal biomass dynamics; plant community structure; insect and fungal diseases of plants; pollination systems; lichens; and upon a number of physiological and biochemical functions. This zonal air pollution system will consist of a separate SO₂ delivery system for each of the four one-acre plots at the stress site, a common monitoring system, and a common electric power system. The system was designed to allow us to maintain a different constant 30-day median concentration on each plot during the growing season. The ultimate design goal was to provide a system for well-defined assessment of the sulfur dioxide impact on otherwise undisturbed grassland ecosystems.

Project Title:

Air Monitoring Characterization at the Hay Coulee Site, Colstrip, Montana

Investigators:

James R. Miller; T. Cail; Allen Lefohn
National Ecological Research Lab
Environmental Protection Agency

Time Frame:

/ /74 to / /79

Descriptive Abstract:

The air monitoring characterization work is an integral component of the Montana coal-fired power plant project designed to determine the effects of emissions from coal-fired power plants on the surrounding environment. A mobile laboratory was installed at Hay Coulee, about seven miles southeast of the Colstrip plant location. Measurements of carbon monoxide, methane, nitric oxide, nitrogen dioxide, ozone, total sulfur, particulates, wind speed and direction are taken and recorded.

Project Title:

A Remote Sensing Study of the Bioenvironmental Effects of Stack Emissions From the Colstrip, Montana, Power Plant

Investigators:

Thomas R. Osberg
Robert A. Lewis
John E. Taylor
National Ecological Research Lab
Environmental Protection Agency

Time Frame:

/ /74 to / /79

Descriptive Abstract:

As a key integrative element of the Montana coal-fired power plant project, we are developing and applying remote sensing as a tool to (a) detect biological effects of air pollutant challenge; (b) measure inventory loss that results from strip mining, installation of power lines, increased human activity, water use and other potentially confounding influences such as pesticides, disease, and population cycling; and (c) aid in the development of predictive models.

ALTERNATIVE SOURCES

ALTERNATIVE SOURCES

00000254

Project Title:

Color Infrared Aerial Photography - Geothermal Resource Areas in Montana
and Wyoming

Investigators:

Jerald Stroebele; John Lloyd

Project Supervisor:

John G. Wood
U.S. Fish and Wildlife Service
711 Central Avenue
Billings, Montana 59102
(406) 245-6711 X-6115

Time Frame:

7/1/75 to 9/30/76

00000382

Project Title:

Geothermal Reconnaissance of Southwestern Montana

Project Supervisor:

Robert A. Chadwick
Department of Earth Sciences
Montana State University
Bozeman, Montana 59715

Time Frame:

6/18/75 to 6/18/78

BIOLOGICAL (FISH, VEGETATION & WILDLIFE)

BIOLOGICAL (FISH, VEGETATION & WILDLIFE)

00000045

Project Title:

Reproduction Biology of Genus Artemisia L. in Eastern Montana

Investigators:

Dr. Thad Weaver
Montana State University
Bozeman, Montana 59715

Project Supervisor:

R. W. Brown
Intermountain Forest & Range Experiment Station
Forestry Sciences Laboratory
860 North 12th East
Logan, Utah 84321

Time Frame:

1/1/74 to 6/30/76

00000071

Project Title:

Survey of the Viability of Indigenous Grasses, Forbs, and Shrubs:
Techniques of Initial Acquisition and Treatment for Propagation in
Preparation for Future Land Reclamation in the Fort Union Basin

Project Supervisor:

Lee E. Eddleman
University of Montana
Missoula, Montana 59801
(406) 243-2573

Time Frame:

6/1/75 to 6/1/76

00000078

Project Title:

Sharptailed Grouse Research With Montana Fish & Game, Colstrip, Montana

Project Supervisor:

Robert E. Carroll
Ecological Consulting Service
Airport Way Building West
Helena, Montana 59601

Time Frame:

4/1/75 to Continuing

00000115

Project Title:

Assessment and Implementation of In-Stream Studies for the Northern
Great Plains

Investigators:

A. Silverman; Ken Bovee; James A. Gore

Project Supervisor:

A. Silverman
Department of Geology
University of Montana
Missoula, Montana 59801
(406) 243-0211

Time Frame:

7/1/75 to 6/30/76

00000121

Project Title:

Toxic Effects on the Aquatic Biota From Coal and Oil Shale Development

Investigators:

R. K. Skogerboe; R. C. Russo

Project Supervisor:

Robert V. Thurston
Fisheries Bioassay Laboratory
Montana State University
Bozeman, Montana 59715
(406) 994-3371

Time Frame:

7/1/75 to 6/30/76

00000135

Project Title:

Investigation of the Bioenvironmental Impact of Fossil Fuel Power Plants
in the Fort Union Basin, Montana

Project Supervisor:

C. C. Gordon
Department of Botany
Environmental Studies Laboratory
University of Montana
Missoula, Montana 59801

Time Frame:

8/1/74 to 9/30/76

00000149

Project Title:

Effects of Coal Extraction and Related Development on Wildlife Population

Project Supervisor:

Robert Phillips
U.S. Fish and Wildlife Service
Denver Wildlife Research Center
Denver Federal Center
Denver, Colorado
(406) 549-3212

Time Frame:

2/1/75 to Indefinite

00000150

Project Title:

Distribution and Abundance of Breeding Birds on Surface Mineable Coal
Lands in the Northern Great Plains

Project Supervisor:

Dr. Joseph Hickey
Department of Wildlife Ecology
University of Wisconsin
Madison, Wisconsin 53715

Time Frame:

7/1/75 to 6/30/79

00000157

Project Title:

Habitat Requirements and Locations of Spawning and Nursery Areas in the
East Poplar River, Montana

Investigator:

Jerry Keiser
Montana Water Quality Bureau
Billings, Montana
(406) 252-5697

Project Supervisor:

Max Botz
Montana Water Quality Bureau
Helena, Montana 59601
(406) 449-2406

Time Frame:

7/1/75 to 6/30/76

00000170

Project Title:

Monitoring Plant Community Changes Due to Fossil Fuel Power Plants in
Eastern Montana

Project Supervisor:

John E. Taylor
Department of Animal & Range Sciences
Montana State University
Bozeman, Montana 59715
(406) 994-3721

Time Frame:

7/15/74 to 7/14/76

00000172

Project Title:

The Bioenvironmental Impact of a Coal-Fired Power Plant

Investigators:

Clancy Gordon; John Taylor; Sharon Eversman; Jerry Dodd; Vern Derr;
Robert A. Lewis

Project Supervisor:

Eric Preston
U.S. Environmental Protection Agency
Corvallis Nat. Ecol. Research Laboratory
700 S.W. 35th Street
Corvallis, Oregon

Time Frame:

6/1/74 to 6/30/78

00000173

Project Title:

Wildlife Inventory of Colstrip, Montana

Project Supervisor:

Robert E. Carroll
Ecological Consulting Service
Airport Way Building West
Helena, Montana 59601

Time Frame:

1/1/72 to Continuing

00000175

Project Title:

Infrared Vegetation Study

Project Supervisor:

Robert E. Carroll
Ecological Consulting Service
Airport Way Building West
Helena, Montana 59601

Time Frame:

7/1/73 to Continuing

00000177

Project Title:

Statistical Analysis of Wildlife and Vegetative/Habitat in the 10 x 20
Area, Colstrip, Montana

Project Supervisor:

Robert E. Carroll
Ecological Consulting Service
Airport Way Building West
Helena, Montana 59601

Time Frame:

1/1/75 to Continuing

00000179

Project Title:

A Cooperative Evaluation of Potential Air Pollution Injury and Damage to
Coniferous Habitats on National Forest Lands Near Colstrip, Montana

Investigator:

Clarence C. Gordon
Environmental Studies Program
University of Montana
Missoula, Montana 59801
(406) 243-2671

Project Supervisor:

U.S. Forest Service
State & Private Forestry
Air Pollution Group
Missoula, Montana 59801

Time Frame:

6/15/75 to 6/30/76

00000331

Project Title:

Rosebud Creek Benthic Invertebrate and Water Quality Study, Colstrip,
Montana

Project Supervisor:

Robert E. Carroll
Ecological Consulting Service
Airport Way Building West
Helena, Montana 59601

Time Frame:

6/1/75 to 1/1/76

00000340

Project Title:

Range Land Resource Research in the Colstrip Area

Investigator:

Frank Munshower

Project Supervisor:

Richard Hodder
Agricultural Experiment Station
Montana State University
Bozeman, Montana 59715

Time Frame:

1/1/72 to Continuing

00000341

Project Title:

The Impact of the Fuel Conversion Process on Native Vegetation in the
Vicinity of Colstrip, Montana

Project Supervisor:

Frank F. Munshower
Department of Animal and Range Science
Montana State University
Bozeman, Montana 59715

Time Frame:

6/1/75 to 5/30/76

00000343

Project Title:

Development of Resource Data on Lands Likely to be Affected by Human
Population Changes Related to Mining and Power Generation Development
in Southeastern Montana

Investigators:

John E. Taylor, Montana State University
A. Silverman, University of Montana
John McBride, University of Montana

Project Supervisor:

Gene F. Payne
Department of Animal and Range Sciences
Montana State University
Bozeman, Montana 59715

Time Frame:

5/1/75 to 9/1/76

00000353

Project Title:

Wildlife and Wildlife Habitat Baseline and Monitoring, Tract III

Investigator:

43-23-A

Project Supervisor:

Robert E. Carroll
Ecological Consulting Service
1300 Block Cedar Street
Helena, Montana 59601

Time Frame:

6/30/73 to Continuing

00000354

Project Title:

Wildlife and Wildlife Habitat Baseline and Monitoring of Big Sky Mine

Project Supervisor:

Robert E. Carroll
Ecological Consulting Service
1300 Cedar Street
Helena, Montana 59601

Time Frame:

6/30/73 to Continuing

00000416

Project Title:

Establishment and Seed Development of Species Grown on Reclaimed
Areas

Investigator:

L. E. Wiesner

Project Supervisor/Institution:

Department of Plant and Soil Sciences
Montana State University
Bozeman, Montana 59715

Time Frame:

10/9/75 to 12/31/78

00000417

Project Title:

Effects of Species Root Distribution in Soil Biota-Genesis-Hydrological
Characteristics

Investigators:

G. A. Nielsen; K. Temple; D. J. Dollhopf

Project Supervisor/Institution:

Agricultural Experiment Station
Montana State University
Bozeman, Montana 59715

Time Frame:

10/9/75 to 12/31/77

00000435

Project Title:

Powder River Ecology Study

Investigator:

Bruce Rehwinkel
Miles City, Montana

Project Supervisor/Institution:

Montana Department of Fish and Game
Capitol Station
Helena, Montana 59601

Time Frame:

9/1/75 to 8/1/76

00000436

Project Title:
Rosebud Creek Study
Investigators:
Al Elser; Jim Schreiber
Project Supervisor/Institution:
Montana Fish and Game Department
Capitol Station
Helena, Montana 59601
Time Frame:
9/1/75 to 8/1/76

00000444

Project Title:
An Evaluation of the Environmental Impact of the Existing Surface Mining
Methods for Western Coal Mines
Investigators:
William S. Kelly
Mathematica, Inc., Mathtech Div.
P.O. Box 2392
Princeton, New Jersey 08540

Peter Briggs
Hittman Associates, Inc.
9190 Red Branch Road
Columbia, Maryland 21045
Project Supervisor/Institution:
S. Jackson Hubbard
Environmental Protection Agency
Cincinnati National Environmental Research Center
Cincinnati, Ohio 45268
Time Frame:
7/1/75 to 9/1/76

00000450

Project Title:
Ranking of Wildlife Values on Federal Coal Lands
Investigator:
James Wambaugh
Project Supervisor:
Robert R. Martinka
Montana Department of Fish and Game
Capitol Station
Helena, Montana 59601
Time Frame:
4/30/76 to 4/1/77

00000455

Project Title:

Predicted Impact of Coal Development on the Fishery Resources of the
Tongue River Reservoir, Montana

Investigator:

R. Penkal

Project Supervisor:

R. W. Gregory

Fishery Research Unit
Montana State University
Bozeman, Montana 59715

Time Frame:

7/1/75 yo 7/1/78

00000456

Project Title:

East Decker Sage Grouse Study

Investigator:

Steve Knapp
Birney
Montana

Project Supervisor/Institution:

Montana Department of Fish and Game
Capitol Station
Helena, Montana 59601

Time Frame:

9/1/75 to 8/1/76

00000457

Project Title:

Sarpy Basin Wildlife and Vegetation Study

Investigator:

Peter Martin
Forsyth
Montana

Project Supervisor/Institution:

Montana Department of Fish and Game
Capitol Station
Helena, Montana 59601

Time Frame:

12/1/73 to Continuing

00000458

Project Title:

Bull Mountains Coal Field Study

Investigator:

Gary Dusek

Roundup

Montana

Project Supervisor/Institution:

Montana Department of Fish and Game

Capitol Station

Helena, Montana 59601

Time Frame:

1/1/72 to 6/1/76

Project Title:

Lower Yellowstone Fisheries Study

Investigator:

Mike Haddix

Montana Department of Fish and Game

Miles City, Montana

Time Frame:

4/ /74 to 7/ /77 (15-month extension)

Descriptive Abstract:

Objectives: (1) To collect basic data to develop a better understanding of existing fish populations and their habitat requirements; (2) To adapt equipment and sampling techniques to large river studies; (3) To develop methods for predicting proposed flow changes on important life history stages of important sport fish.

Project Title:

Survey of Grasses, Forbs & Shrubs in Preparation for Land Reclamation (Continuation of 'Survey of the Viability of Indigenous Grasses, Forbs and Shrubs')

Investigator:

Dr. Lee E. Eddleman

University of Montana

School of Forestry

Missoula, Montana 59801

Time Frame:

6/1/76 to 5/30/77

Descriptive Abstract:

Objectives: (1) Examine and inventory natural seed maturation and production characteristics of indigenous plant species in the Ft. Union Basin; (2) Determine optimum seed collection, handling and storage procedures; (3) Determine the physical and chemical requirements for breaking seed dormancy; (4) Determine seed germination characteristics; (5) Study vegetative propagation characteristics using stem cuttings and rhizomes; and (6) Evaluate each species as to its potential for initial and followup spoil bank revegetation.

Project Title:

Prediction of the Effects of Energy Development on the Aquatic Resources of Two Upper Missouri River Reservoir Ecosystems

Investigator:

Bill Nelson

Northcentral Reservoir Investigation Team

U.S.F. & W.S.

Pierre, South Dakota

Time Frame:

7/1/76 to 7/1/77

Descriptive Abstract:

(1) Inventory and characterize the biological, physical and chemical conditions of the Big Dry Arm of Fort Peck Reservoir, Montana, and of Lake Sakakawea in the vicinities of Dunn and Mercer Counties, North Dakota. (2) Identify and rank, in coordination with appropriate state, federal, private and industrial organizations, all known and anticipated impacts of

energy or energy-related developments on the aquatic biota and water quality of these reservoirs. These items shall include, but not be limited to, liquid and atmospheric waste emissions from coal conversion facilities, water withdrawals, construction activities, land-use patterns, municipal wastes, energy transportation, irrigation return water, etc.

(3) Develop a simple mechanism, e.g., a matrix to integrate data from objectives (1) and (2) so that the cumulative effects of energy development at various levels of intensity on the reservoir ecosystem can be predicted.

(4) Based on information derived from objectives (1)-(3), develop strategies, criteria and guideline recommendations to:

- (a) provide practical development alternatives for avoiding or minimizing damage to the aquatic environment;
- (b) mitigate losses resulting from energy development, and
- (c) where possible, utilize development-related environmental modifications to enhance water quality and fish and wildlife habitat.

Project Title:

Decker-Birney Wildlife Study

Investigator:

Steve Knapp

Montana Department of Fish and Game

Birney, Montana

Time Frame:

8/ /74 to 6/ /76

Descriptive Abstract:

(1) To gather fish and wildlife resource information to fill the recognized needs of the Decker-Birney Study, and

(2) To develop techniques to quantify wildlife resources, either directly or through habitat quality and population productivity indices.

Project Title:

Fisheries Investigations of the Yellowstone River, as Related to Water Quality
Investigations of the Yellowstone River, Montana

Investigator:

Larry Peterman

Montana Department of Fish and Game

Miles City, Montana

Time Frame:

4/ /76 to 11/ /76

Descriptive Abstract:

This study will complement an existing fisheries study being conducted by the Department of Fish and Game on the lower Yellowstone River. This study, along with the water quality, invertebrate, furbearer, waterfowl and other aquatic studies previously mentioned, will aid in attaining a better understanding of the total Yellowstone River ecosystem. This information will help forecast the consequences of proposed developments and will help formulate a water management plan to protect the stream for biological needs.

Project Title:

Impact of Coal Strip Mining on the Aquatic Resources of Sarpy Creek
Drainage, Montana

Investigator:

R. W. Gregory
Montana Cooperative Fishery Research Unit
Montana State University
Bozeman, Mt. 59715

Time Frame:

/ / to 12/ /76

Descriptive Abstract:

Predict the extent to which aquatic resources may be affected during surface coal mining operations including the value of the resources. Prepare recommendations for conducting mining activities with minimal damage to aquatic ecosystems.

Project Title:

Impact of Energy Development of the Wildlife of Northwestern Wyoming,
Northwestern South Dakota, and Southeastern Montana

Investigator:

Dr. Frank Schitoskey
South Dakota State University
Fish and Wildlife Cooperative Unit
Brookings, South Dakota 57006

Time Frame:

7/1/75 to 6/30/79

Descriptive Abstract:

Develop baseline information and methodologies to assess regional impacts of coal processing. This study, conducted in Wyoming, Montana and South Dakota, will develop a simulation model of wildlife and energy dynamics of a short prairie ecosystem.

Project Title:

Lower Yellowstone Aquatic Invertebrate and Forage Fish Study

Investigator:

Robert Newell
Montana Department of Fish and Game
Glendive, Montana

Time Frame:

8/ /74 to 8/ /76

Descriptive Abstract:

Objectives: (1) Inventory aquatic invertebrates and forage fish supporting major fish populations in the lower Yellowstone River; and (2) Assess potential effects of reduced river flows on aquatic invertebrates.

Project Title:

Yellowstone River Migratory Bird Study

Investigator:

Tom Hinz

Montana Department of Fish and Game

Miles City, Montana

Time Frame:

9/ /74 to 8/ /76

Descriptive Abstract:

Objectives: (1) To inventory and assess importance of Yellowstone River to migratory birds; and (2) To assess effects of altered stream flows on migratory birds using the river.

Project Title:

Lower Yellowstone River Furbearer Study

Investigator:

Peter Martin

Montana Department of Fish and Game

Forsyth, Montana

Time Frame:

8/ /74 to 8/ /76

Descriptive Abstract:

Objectives: (1) Inventory furbearers and associated habitat types along the lower Yellowstone River, and (2) Assess impact of altered stream flows on furbearer populations.

Project Title:

Tongue River Fisheries Study

Investigator:

Al Elser

Bob Newell

Larry Peterman

Montana Department of Fish and Game

Capitol Station

Helena, Montana 59601

Time Frame:

8/ /74 to 8/ /76

Descriptive Abstract:

Objectives: (1) To collect basic fish population data, species diversity, and longitudinal distribution on the Tongue River; (2) To identify and determine species diversity for aquatic invertebrates and forage fish on the middle and lower Yellowstone River; and (3) To assess potential effects of dewatering on these components of the ecosystem.

COAL

COAL

00000211

Project Title:

In-Situ Gasification of Thick, Deeply-Buried Western Coal Deposits

Investigator:

Dr. Douglas Stephens

Project Supervisor/Research Institute

Lawrence Livermore Laboratory

Chemistry and Materials Science Department

Lawrence Livermore Laboratory

Earth Sciences Division

Livermore, California 94550

Time Frame:

7/1/72 to Continuing

00000227

Project Title:

Evaluation of Alternative Transportation and Earth Placement Systems

Applicable to Surface Mining Sites

Project Supervisor:

Alfred C. Scheer; Donald R. Reichmuth

Department of Civil Engineering

Montana State University

Bozeman, Montana 59715

(406) 994-2111

Time Frame:

6/15/74 to 6/30/76

00000301

Project Title:

U.S.G.S. Coal Exploration

Project Supervisor:

Robert E. Matson

Montana Bureau of Mines and Geology

Butte, Montana 59701

Time Frame:

11/15/75 to 11/15/76

00000302

Project Title:

U.S.G.S. Mine Sampling Project

Project Supervisor:

Robert E. Matson

Montana Bureau of Mines and Geology

Butte, Montana 59701

Time Frame:

10/1/75 to 11/15/76

00000351

Project Title:

Systems Evaluation of the Use of Low Sulfur Western Coal in Small and Intermediate Size Boilers

Investigator:

Kenneth L. Maloney

KVB, Inc.

Tustin, California

Time Frame:

2/13/75 to 2/13/77

00000365

Project Title:

MHD Systems, Instrumentation and Control -- Recovery and Utilization of Dilute Nitric Oxide From an MHD Generator

Investigator:

F. P. McCandless

Department of Chemical Engineering

Montana State University

Bozeman, Montana 59715

Project Supervisor/Research Institute:

Montana Energy and MHD Research and Development Institute

Box 3809

Butte, Montana 59701

Time Frame:

3/18/75 to 3/31/76

00000367

Project Title:

Preliminary Design of a Direct Fired, Falling-Bed Air Preheater for an
MHD Generator Test Facility

Investigators:

R. L. Mussulman
Department of Mechanical Engineering
Montana State University
Bozeman, Montana 59715

W. E. Genetti
Department of Chemical Engineering
Montana State University
Bozeman, Montana 59715

Project Supervisor/Research Institute:

Montana Energy and MHD Research and Development Institute
Box 3809
Butte, Montana 59701

Time Frame:

3/18/75 to 7/31/76

00000368

Project Title:

Physical Properties of Coal Slags Related to MHD Systems

Investigator:

G. Lapeyre
Department of Physics
Montana State University
Bozeman, Montana 59715

Project Supervisor/Research Institute:

Montana Energy and MHD Research and Development Institute
Box 3809
Butte, Montana 59701

Time Frame:

3/18/75 to 7/31/76

00000369

Project Title:

MHD Systems, Instrumentation and Control -- MHD Systems Instrumentation
and Data Acquisition

Investigators:

R. Johnson
Department of Electrical Engineering
Montana State University
Bozeman, Montana 59715

Project Supervisor/Research Institute:

Montana Energy and MHD Research and Development Institute
Box 3809
Butte, Montana 59701

Time Frame:

3/18/75 to 7/31/76

00000370

Project Title:

Slag Physical Properties

Investigator:

V. H. Schmidt

Department of Physics

Montana State University

Bozeman, Montana 59715

Project Supervisor/Research Institute:

Montana Energy and MHD Research and Development Institute

Box 3809

Butte, Montana 59701

Time Frame:

3/18/75 to 7/31/76

00000371

Project Title:

Slag Flow Characteristics and Nox Kinetics in MHD Heat Exchangers

Investigators:

H. W. Townes; T. C. Reihman

Department of Mechanical Engineering

Montana State University

Bozeman, Montana 59715

Project Supervisor/Research Institute:

Montana Energy and MHD Research and Development Institute

Box 3809

Butte, Montana 59715

Time Frame:

3/18/75 to 7/31/76

00000372

Project Title:

MHD Systems, Instrumentation and Control (Cycle Analysis and Control)

Investigator:

D. Pierre

Department of Electrical Engineering

Montana State University

Butte, Montana 59701

Project Supervisor/Research Institute:

Montana Energy and MHD Research and Development Institute

Box 3809

Butte, Montana 59701

Time Frame:

3/18/75 to 7/31/76

00000374

Project Title:

MHD Systems, Instrumentation and Control - Inverter

Investigator:

R. Durnford

Department of Electrical Engineering

Montana State University

Bozeman, Montana 59715

Project Supervisor/Research Institute:

Montana Energy and MHD Research and Development Institute

Box 3809

Butte, Montana 59701

Time Frame:

3/18/75 to 7/31/76

00000375

Project Title:

Coal Hydrogenation and Hydrocracking Using a Metal Chloride-Gaseous

HCL Catalyst System

Project Supervisor:

F. P. McCandless

Department of Chemical Engineering

Montana State University

Bozeman, Montana 59715

Time Frame:

7/1/75 to 6/30/77

00000376

Project Title:

Catalytic Hydrogenation of Coal Derived Liquids

Investigator:

F. P. McCandless

Project Supervisor:

Lloyd Berg

Department of Chemical Engineering

Montana State University

Bozeman, Montana 59715

Time Frame:

6/20/75 to 6/19/78

00000441

Project Title:

Environmental Effects From Leaching of Coal Conversion By-Products

Project Supervisor:

Wayne Van Meter; Ronald Erickson

University of Montana

Missoula, Montana 59801

Time Frame:

6/17/75 to 6/17/78

00000445

Project Title:

Underground Coal Production, Roundup Mine

Investigator:

Glenn Johnson

Western Coal Company

803 First Street, W.

Roundup, Montana 59072

Project Supervisor:

Ralph Gildroy

Central Montana District Six Council

Box 302

Roundup, Montana 59072

Time Frame:

12/3/75 to 6/15/76

00000466

Project Title:

MHD Environmental Impact Study -- Task H-5

Investigator:

Don Brelsford

Project Supervisor/Institution:

Montana Energy and MHD Research and Development Institute

Butte, Montana 59701

Time Frame:

3/18/75 to 7/30/76

00000480

Project Title:

Heat Transfer From Horizontal Finned Tube Bundles in a Fluidized Bed

Project Supervisor:

William E. Genetti

Department of Chemical Engineering

Montana State University

Bozeman, Montana 59715

Time Frame:

9/1/73 to 9/1/76

00000488

Project Title:

Characterization of Coal for Open-Cycle MHD Power Generation System

Task A

Investigator:

F. E. Diebold

Project Supervisor:

Vernon Griffiths

Montana College of Mineral Sciences and Technology

Butte, Montana 59701

Montana Energy and MHD Research and Development Institute

Butte, Montana 59701

Time Frame:

4/1/75 to 7/30/76

00000489

Project Title:

Corrosion Studies of Pre-Heater Materials - Task B

Investigator:

W. D. Callister

Project Supervisor:

Vernon Griffiths

Montana College of Mineral Sciences and Technology

Butte, Montana 59701

Montana Energy and MHD Research and Development Institute

Butte, Montana 59701

Time Frame:

4/1/75 to 7/30/76

00000490

Project Title:

Preparation of Coals for Utilization in Direct Coal-Fired MHD Generation -
Task C

Investigator:

G. F. Ziesing

Project Supervisor:

Vernon Griffiths

Montana College of Mineral Sciences and Technology
Butte, Montana 59701

Montana Energy and MHD Research and Development Institute
Butte, Montana 59701

Time Frame:

4/1/75 to 7/30/76

Project Title:

An Analysis of the Applicability of the Production of Synthetic Liquid Fuels From Coal in Montana

Investigator:

John McBride
Department of Geology
University of Montana
Missoula, Montana 59601

Project Supervisor/Institution:

University of Montana

Time Frame:

5/1/76 to 7/15/76

Descriptive Abstract:

This analysis will include a description of the technology of coal liquefaction, economics of the technology and applicability of liquefaction in Montana.

Project Title:

Analysis of Off-Site Lurgi Requirements

Investigator:

Lummus Corporation

Project Supervisor/Institution:

Lummus Corporation

Time Frame:

/ / to 7/ /76

Descriptive Abstract:

Determination of off-site, non-Lurgi requirements necessary for the development of a Lurgi high BTU gasification facility. Their work will include manpower, capital cost, and resource requirements for non-Lurgi operating units. This study is part of the Montana Task Force on Coal Gasification.

Project Title:

Lurgi Process Evaluation

Investigator:

American Lurgi Corporation

Project Supervisor:

American Lurgi Corporation

Time Frame:

/ / to 6/30/76

Descriptive Abstract:

The American Lurgi Corporation has been contracted to evaluate their process taking into account unique features and constraints for synthetic natural gas production in Montana. This study will provide the Task Force with both a conceptual design and preliminary engineering specifications for a 180 million cubic foot per day facility, utilizing Montana lignite.

Project Title:

Technology Process Selection Study

Investigator:

Dravo Corporation
Pittsburgh, Pennsylvania

Time Frame:

5/24/76 to 10/24/76

Descriptive Abstract:

Before consideration can be given to the selection of an appropriate coal conversion process, technology state of the art must be compared and contrasted with specific requirements and problems imposed by the Montana environment. The Task Force's final decision and recommendation will require extensive justification and documentation of the suitability of a first generation gasification process versus the financial incentives which second generation or demonstration scale high BTU gasification processes offer. Additionally, coal liquefaction and oil/gas processes will be reviewed so that the decisions reached by the Task Force reflect the most suitable technology available at this time to meet anticipated Montana requirements. Dravo Corporation will conduct an evaluation of the relative merits of various synfuel technologies.

Project Title:

Cost/Demand Analysis

Investigator:

Montana Energy and MHD Research and Development Institute

Time Frame:

5/1/76 to 6/30/76

Descriptive Abstract:

Preceding any determination of Montana gasification viability, the relationship between fuel production cost and marketability must be explored. This study will examine the relationship that exists between gas costs, supply and demand and will yield an estimate of the marketability of the products generated in a 1985-1995 time frame. This study is part of the Montana Task Force on Coal Gasification.

Project Title:

Limits and Cost Sensitivity of Alternate Parting Handling Methods

Investigator:

Thomas E. Finch
Assistant Professor of Mining Engineering
Montana Tech
Butte, Montana 59701

Time Frame:

12/1/75 to 12/1/76

Descriptive Abstract:

Objective: Generate a computer program to look at cost sensitivity of different methods of parting handling. Physical limits of applicable machinery will also be considered.

Project Title:

Projections of Montana Coal Mining and Energy Conversion Development

Investigators:

Arnold Silverman

Thomas Power

Richard Stroup

Project Supervisor/Institution:

University of Montana

Missoula, Montana 59801

Montana State University

Bozeman, Montana 59715

Time Frame:

5/1/75 to 4/30/76

Descriptive Abstract:

This study will project probable levels of coal development in Montana and adjacent areas of the Fort Union Basin over the next 10, 15 and 25 years. This information is needed by the social and economic researchers who are attempting to determine the impact of increased population and industrialization on the economic, social and political organization of Eastern Montana and in fact by other problem area workgroups as well.

The base data from which projections of possible levels of Montana/Fort Union coal development will proceed are the contracts coal companies operating in this region have already signed. Projections beyond these levels will be based on the following studies: (1) the demand for electricity, (2) alternative energy sources for electric generation, (3) price and availability of natural gas, (4) other coal sources, and (5) coal as a raw material for the production of other energy forms and related materials.

ECONOMICS

ECONOMICS

00000193

Project Title:

Socio-Economic Impact Study of Coal and Oil Shale Boom Towns

Investigator:

John S. Cilmore

University of Denver Research Institute

Denver, Colorado

Time Frame:

2/ /76 to 1/ /77

00000205

Project Title:

Estimate Economic, Social and Cultural Consequences of Coal and Oil Shale
Development to Support Integrated Assessment Studies

Project Supervisor:

U.S. Department of Agriculture

Economic Research Service

Washington, D.C. 20250

(202) 447-7133

Time Frame:

6/1/75 to 6/1/77

00000471

Project Title:

Fiscal Impact of Coal Development on Local Government

Project Supervisor:

Maxine Johnson

Bureau of Business & Economic Research

University of Montana

Missoula, Montana 59801

Time Frame:

3/6/75 to 9/30/76

00000473

Project Title:

Macro Economic Impact of Coal and Oil Shale Development in the Inter-
mountain West

Investigator:

C. Lewis

Project Supervisor/Institution:

Utah State University
Office of Resource Development
Agricultural Science Building
Room 223A
Logan, Utah 84321

Time Frame:

4/1/76 to 3/31/77

00000474

Project Title:

Economic Analysis of the Impacts of Coal Development in Montana

Investigator:

R. L. Stroup

Project Supervisor/Institution:

Agricultural Experiment Station
Montana State University
Bozeman, Montana 59715

Time Frame:

7/1/75 to 6/30/76

00000477

Project Title:

Economics of Coal and Oil Shale Development on Environmental Quality
in Rural Areas

Investigators:

John Green; Virgil Whetzel; Mel Skold; Linley Juers; Ken Leathers;
Joe Diemer
Colorado State University
Tom Stinson
University of Minnesota
Stanley Voelker; W. McMartin
North Dakota State University
Jeff Conapost
U.S. Department of Agriculture

Project Supervisor:

Lloyd Bender
Montana State University
Bozeman, Montana 59715

Time Frame:

6/30/74 to 9/30/78

Project Title:

Western Regional Energy Development Study -- Phase III -- Socioeconomic Impacts and Secondary Impacts

Investigator:

John Gilmore
Denver Research Institute
University of Denver
Denver, Colorado

Time Frame:

1/76 to 12/76

Descriptive Abstract:

The purpose of Phase III is to develop a methodology to assess the socioeconomic impacts of western regional energy development. Phases I and II have been completed.

Project Title:

Economic Analysis of Oil Refining in Montana

Investigator:

Paul E. Polzin
Bureau of Business and Economic Research
University of Montana
Missoula, Montana 59801

Time Frame:

5/1/76 to 7/15/76

Descriptive Abstract:

This two-part study will provide: (1) an overview of oil refining in Montana, including historic trends in output, employment, and sources of crude oil and characteristics of the oil refining industry and (2) projected impact of alternative scenarios -- projected declines in employment and earning for Montana and Billings area of alternative scenarios concerning future distribution of crude oil to Montana refineries. The scenarios will be developed by the Montana Energy Advisory Council.

Project Title:

Site Tradeoff Study

Investigator:

Don Brelsford
Montana Energy and MHD Research and Development Institute
P.O. Box 3809
Butte, Montana 59701

Time Frame:

6/1/76 to 9/30/76

Descriptive Abstract:

This study will examine the merits of siting at a mine mouth location versus a site currently possessing an infrastructure but located in an area remote to coal and water resources.

A mine mouth site has the advantage of short haul distances which facilitate the transportation to the feedstock and in turn minimizes resource transportation cost.

The remote site has housing, sewers, road systems and amenities and would, therefore, lessen the socio-economic problems arising from the development of an industrial facility which would require a relocation of work forces to that area. The utilization of the remote site would minimize social impacts and life-style modifications, and would, additionally, avoid the development of a "company town" totally dependent upon project duration and performance.

Conversely, a mine mouth location would require the construction of a community including, but not limited to, housing, roads, sewer systems, residential power source and transmission lines and other amenities that are required by any population. Further, once the plant's life has been realized, in most cases, no economic incentive remains to continue living in that particular area. This type of "boom town" development can be avoided if a remote site can be shown to be socially and economically competitive with a mine mouth site.

This study is part of the Montana Task Force on Coal Gasification.

ENERGY POLICY

ENERGY POLICY

00000153

Project Title:

The Impact of Coal Development in the Fort Union Basin, Montana, and
Neighboring States

Project Supervisor:

Arnold J. Silverman
Department of Geology
University of Montana
Missoula, Montana 59801
(406) 243-0211

Time Frame:

5/1/76 to 4/30/76

00000295

Project Title:

Laws Relating to Wildlife and Energy Development

Project Supervisor:

Robert Beck
Law School
University of North Dakota
Grand Forks, North Dakota 58202
(701) 777-2961

Time Frame:

7/1/75 to 6/30/77

00000300

Project Title:

Technology Assessment of Western Energy Resource Development

Investigators:

F. Scott Lagrone
Radian Corporation
8500 Shoal Creek Blvd.
Austin, Texas 78766

Project Supervisor:

Irvin L. White
Science and Public Policy Program
University of Oklahoma
601 Elm, Room 432
Norman, Oklahoma 73069

Time Frame:

7/1/75 to 1/1/76

Project Title:

Montana Task Force on Coal Gasification

Investigator:

James R. Hodge

Montana International Trade Commission

P.O. Box 767

Butte, Montana 59701

Time Frame:

6/ /75 to Continuing

Descriptive Abstract:

In June 1975, Governor Thomas Judge and the Montana Congressional Delegation established the Montana Task Force on Coal Gasification to investigate various methods of alleviating Montana's potential natural gas problem. The Task Force functions as an investigative information gathering and evaluation source to determine the viability of coal gasification as a fuel resource to Montana. The results of activities engaged in by the Task Force will indicate to appropriate decision-makers the potentials and problems associated with the production of synthetic gas and/or synthetic liquid fuels in Montana.

The gasification feasibility program that the Task Force is currently pursuing divides the project into seven activity areas, six of which are listed separately under the following project titles: Technology Process Selection Study, Lurgi Process Evaluation, Analysis of Off-Site Lurgi Requirements, Cost/Demand Analysis, Site Trade-Off Study.

Project Title:

Fort Union Regional Task Forces

Investigator:

Sheila Miedema

North Dakota Legislative Council

Capitol Building

Bismarck, North Dakota 58501

Time Frame:

4/15/76 to 4/1/77

Descriptive Abstract:

Because of the anticipated large-scale development of the vast lignite resources in the Fort Union Coal Formation States of Montana, North Dakota, South Dakota and Wyoming, there is a need for the development of a permanent mechanism to facilitate information exchange and movement toward joint standards and other interstate agreements in the region for the purpose of effective management of the development of these natural resources.

In Phase I of this proposal we requested funds for holding a four-state conference to discuss these problems and attempted to develop a consensus for the need of such a mechanism. Governors, legislators, members of the executive branch of state governments, representatives of educational institutions, appropriate state and regional federal officials, and observers from the Province of Saskatchewan attended the Fort Union Coal Conference in October 1975. The conference agreed to establish committees on subject areas of the problem for continuous study, information exchange and the possible development of joint standards and interstate agreements during the 12 months of Phase II. Funds are requested for a project coordinator, clerical person, travel, supplies and materials for Phase II of the project.

The objective of Phase II is to establish a series of four-state task forces to continue the discussion of common problems; exchange information on research developments, technical data and policy development; and seek areas where possible interstate agreements, compacts, or common standards or policies might be feasible and desirable for the regulation of various aspects of the development of natural resources in the four states of the Fort Union coal formation.

ENVIRONMENTAL IMPACT STATEMENTS

ENVIRONMENTAL IMPACT STATEMENTS

00000443

Project Title:

Draft Environmental Statement, Crow Ceded Area Coal Lease, Tracts II
and III, Westmoreland Resources

Project Supervisor:

David W. Pennington
U.S. Bureau of Indian Affairs
316 North 26th Street
Billings, Montana 59101

Time Frame:

12/15/75 to 8/30/76

Project Title:

Anaconda-Hamilton Transmission Line Study (EIS Draft)

Investigator:

Albert Tsao

Energy Planning Division

Department of Natural Resources and Conservation

32 S. Ewing

Helena, Montana 59601

Time Frame:

// to 5/ /76

Descriptive Abstract:

Study of need and environmental compatability of a 161 KV power transmission line from Anaconda to Hamilton, Montana, proposed by the Montana Power Company.

Project Title:

Proposed Expansion of Western Energy Company's Rosebud Mine Into Area B -- Draft EIS

Investigator:

Brace Hayden

Environmental Coordinator

Department of State Lands

Capitol Station

Helena, Montana 59601

Time Frame:

// to 7/ /76

Descriptive Abstract:

Western Energy Company is seeking to expand their mine into a new mining area entitled Area B. Area B is located approximately one mile to the southwest of Colstrip. Specifically, Western Energy wants to permit 1,176 acres: (1) 491.22 acres for strip mining or spoiling, (2) 107.04 acres for haul roads and facilities, and (3) 577.02 acres for associated disturbance. Included in the permit application is a request for a dragline corridor to move one of Western Energy's draglines across Armells Creek.

Project Title:

Sioux Planning Unit -- Custer National Forest -- Draft Environmental Statement

Investigator:

D. C. MacIntyre

Forest Supervisor

Custer National Forest

U.S. Department of the Interior

Billings, Mt. 59101

Time Frame:

// 10/ /76

Descriptive Abstract:

The Sioux Planning Unit is of particular resource interest because of the uranium, oil and gas exploration that has taken place within the Unit since

1972. Mobil Oil Corporation staked 1,165 claims covering approximately 23,000 acres in the Long Pines several years ago. They began exploratory drilling on these claims in 1973 to prospect suspected uranium deposits in the Fox Hill sand formation. The outcome of this ongoing exploration will not be known for several years.

An oil well exists on the Planning Unit in the North Cave Hills. It has produced over one-quarter million barrels of oil since April 1972. It is the largest producing oil well in South Dakota. It seems probable that there will be more discovery and development of oil or gas in the Planning Unit. Future development could result in small 1-5 well fields, although there may be a potential for discovery of larger fields.

GEOLOGY & SOILS

GEOLOGY & SOILS

00000229

Project Title:

Geochemical Survey of the Western Coal Regions

Investigators:

R. J. Ebens; J. M. McNeal; G. L. Feder; R. R. Tidball; R. C. Severson;
J. A. Erdman; L. P. Gough; B. M. Anderson

Project Supervisor:

Jon J. Conner
U.S. Geological Survey
Denver Federal Center
Lakewood, Colorado 80225
(303) 234-3715

Time Frame:

1974 - 1979

00000408

Project Title:

Rates of Erosion in the Colstrip Area

Project Supervisor:

Jack Schmidt
Montana Department of State Lands
Reclamation Division
Helena, Montana 59601

Time Frame:

6/1/75 to 6/1/76

Project Title:

Range Land Resource Research

Investigator:

Dr. Richard Hodder
Frank Munshower
Animal and Range Sciences Department
Montana State University
Bozeman, Mt. 59715

Time Frame:

/ /72 to Continuing

Descriptive Abstract:

The Montana Agricultural Experiment Station has been collecting physical and chemical information on soils, animals and range vegetation since 1972. Major plant communities have been isolated with enclosures so as to monitor future changes relative to stack emissions. Chemical elements being studied in soils, vegetation and small mammals were selected according to availability in Rosebud coal and toxicity to plants and animals.

GOVERNMENTAL STUDIES

GOVERNMENTAL STUDIES

00000184

Project Title:

Montana Community Technical Assistance Program

Project Supervisor:

Director

Montana Department of Community Affairs

1424 Ninth Avenue

Helena, Montana 59601

(406) 449-3494

Time Frame:

3/26/75 to 3/31/77

Project Title:

Community Assistance Handbook

Investigator:

Bill Lamont

Briscoe, Maphis and Lamont

Boulder, Colorado

Project Supervisor:

George Collins

Briscoe, Maphis and Lamont

Boulder, Colorado

Time Frame:

1/ /76 to 9/ /76

Descriptive Abstract:

The handbook will contain site-specific examples of problems encountered in energy development impacted areas, and will be directed towards local government officials to assist them in getting and using outside assistance.

Project Title:

Rural Planning Reference Text

Investigator:

Frank Beal

American Society of Planning Officials

1313 East Sixtieth Street

Chicago, Illinois 60637

Time Frame:

4/15/76 to 10/15/77

Descriptive Abstract:

Planning has mainly been focused on urban planning and urban planning problems, leaving rural planners with little reference materials that related directly to their situation. The objectives of this project are as follows:

(1) To produce an authoritative text on the principles and practices of rural planning which includes methods and techniques for resolution of rural planning issues, standards for rural development and approaches for resolution of specialized issues unique to rural areas in the Old West Region.

(2) To provide for wide distribution and use of the text through user conferences.

The contractor will be working closely with persons in the Old West Region who are responsible for rural planning.

LAND (USE, OWNERSHIP AND RECLAMATION)

LAND (USE, OWNERSHIP AND RECLAMATION)

00000008

Project Title:

Simulation Modeling of Environmental and Social Impacts of Coal Development in the Powder River Basin

Project Supervisor:

Richard Doell
U.S. Geological Survey
345 Middlefield Road
Menlo Park, California 94025
(415) 323-8111

Time Frame:

1/1/75 to 10/1/76

00000012

Project Title:

Potential of Coal Strip Mine Fills as Aquifers in the Powder River

Investigator:

Perry H. Rahn

Project Supervisor:

Norman Orava
South Dakota School of Mines & Technology
Department of Engineering
Rapid City, South Dakota 57701

Time Frame:

7/1/74 to 6/30/76

00000015

Project Title:

Selection of Suitable Plant Materials and Development of Plant Establishment Techniques (Reclamation)

Investigator:

R. S. MacLaughlan

Project Supervisor/Research Institute:

U.S. Department of Agriculture
Soil Conservation Service
Washington, D.C. 20250

Time Frame:

1/1/73 to Indefinite

0000036

Project Title:

Premining Evaluation of Overburden at Coal Strip Mining Areas of Powder River Basin, Wyoming-Montana

Investigator:

Teruo Yamamoto
Room 1662
Forest Research Laboratory
South Dakota School of Mines & Technology
Rapid City, South Dakota 57701

Project Supervisor:

Ardell J. Bjugstad
Room 1711
Forest Research Laboratory
South Dakota School of Mines & Technology
Rapid City, South Dakota 57701

Time Frame:

5/75 to 5/77

0000042

Project Title:

Effects of Different Rehabilitation Treatment Methods on Surface Runoff Quantity and Quality and Erosional Behavior of Surface Mine Spoils in the Intermountain West

Project Supervisor:

P. E. Packer
Intermountain Forest & Range Experiment Station
Forestry Sciences Laboratory
860 N. 12th East
Logan, Utah 84321

Time Frame:

1/1/74 to 12/30/78

00000043

Project Title:

Photo Interpretation as a Tool for Assessing the Revegetation of Surface Mined Areas

Investigator:

Bland Richardson

Project Supervisor:

P. E. Packer
Intermountain Forest & Range Experiment Station
Forestry Sciences Laboratory
Logan, Utah

Time Frame:

7/1/73 to 1/7/78

00000044

Project Title:

Demonstration of Revegetation Techniques

Investigator:

Frank Kenney
Decker Coal Company
c/o Peter Kiewit & Sons
Sheridan, Wyoming 82801

Project Supervisor:

Bland Z. Richardson
Intermountain Forest & Range Experiment Station
Forestry Sciences Laboratory
860 North 12th East
Logan, Utah 84321

Time Frame:

1/1/74 to 1/15/77

00000046

Project Title:

Effects of Fertilizer Rate and Time of Application on a Mine Spoil
Rehabilitation Seeding

Investigator:

Dr. R. L. Meyn
Montana Agricultural Experimental Station
Montana State University
Bozeman, Montana 59715

Project Supervisor:

P. E. Packer
Intermountain Forest & Range Experiment Station
Forestry Sciences Laboratory
860 12th East
Logan, Utah 84321

Time Frame:

1/1/74 to Continuing

00000047

Project Title:

Performance of Individual Species in Various Grass Mixtures Growing on
Mine Overburden Piles

Investigators:

Ray Brown

Project Supervisor:

Paul Packer
Intermountain Forest & Range Experiment Station
Forestry Sciences Laboratory
860 North 12th East
Logan, Utah 84321

Time Frame:

Ongoing

00000050

Project Title:

Hydromulching as an Alternative Mulching Method on Surface Mine Disturbances. Commodities: Coal, Copper, Cobalt, Phosphate, Gold

Investigators:

Bland Z. Richardson; Eugene E. Farmer

Project Supervisor:

P. E. Packer

Intermountain Forest & Range Experiment Station

Forestry Sciences Laboratory

860 N. 12th East

Logan, Utah 84321

Time Frame:

10/1/73 to 10/1/76

00000051

Project Title:

Use of Organic Soil Amendments in the Revegetation of Surface Mines.

Commodities: Coal, Cobalt, Copper, Gold

Investigators:

Bland A. Richardson; Ray Brown; Eugene E. Farmer

Project Supervisor:

Paul Packer

Intermountain Forest & Range Experiment Station

Forestry Sciences Laboratory

860 North 12th East

Logan, Utah 84321

Time Frame:

7/1/73 to 1/7/76

00000053

Project Title:

Characterization of Physical and Chemical Properties of Spoils

Investigators:

F. M. Sandoval; R. E. Ries; W. O. Willis

Project Supervisor:

J. F. Power

Northern Great Plains Research Center

P.O. Box 459

Mandan, North Dakota 58554

Time Frame:

5/1/74 to Indefinite

00000054

Project Title:

Preliminary Evaluation of Strip Mine Spoils and Methods for Their
Revegetation. Commodity: Coal

Investigators:

F. M. Sandoval; J. F. Power; W. O. Willis

Project Supervisor:

J. J. Bond
Northern Great Plains Research Center
P.O. Box 459
Mandan, North Dakota 58554
U.S. Agricultural Research Service
Northern Great Plains Research Center
P.O. Box 459
Mandan, North Dakota 58554

Time Frame:

1/1/70 to Indefinite

00000066

Project Title:

Energy Minerals Rehabilitation Inventory and Analysis -- EMRIA

Project Supervisor:

Ronald Kuhlman
U.S. Bureau of Land Management
D-307, Building 50
Denver Federal Center
Denver, Colorado 80225
(303) 234-2333

Time Frame:

9/1/74 to Indefinite

00000072

Project Title:

Establishment, Succession, and Stability of Vegetation on Surface Mined
Lands in Eastern Montana

Project Supervisor:

Brian W. Sindelar
Montana State University
Bozeman, Montana 59715
(406) 994-0211

Time Frame:

6/1/75 to 6/1/76

00000074

Project Title:

Column Leaching Studies of Coal Mine Spoil Material

Project Supervisor:

Gordon K. Pagenkopf
Associate Professor
Department of Chemistry
Montana State University
Bozeman, Montana 59715

Time Frame:

2/1/75 to 6/30/76

00000076

Project Title:

Mined Land Reclamation Research

Project Supervisor:

Richard L. Hodder
Agricultural Experiment Station
Montana State University
Bozeman, Montana 59715

Time Frame:

1/1/68 to Continuing

00000080

Project Title:

Evaluation of Solid Waste as Physical and Chemical Amendments in
Revegetation of Coal Surface Mine Spoils

Investigator:

Howard Peavy

Project Supervisor

R. L. Sanks
Montana State University
Bozeman, Montana 59715
(406) 994-2111

Time Frame:

6/20/75 to 6/30/76

00000091

Project Title:

Trend-Surface Analysis of Powder River Basin, Wyoming, Wyoming-Montana,
and Williston Basin, North Dakota

Investigator:

Teruo Yamamoto
Room 1662
Forest Research Laboratory
South Dakota School of Mines and Technology
Rapid City, South Dakota 57701

Project Supervisor:

Ardell J. Bjugstad
Room 1711
Forest Research Laboratory
South Dakota School of Mines and Technology
Rapid City, South Dakota 57701

Time Frame:

9/1/74 to 6/1/76

00000171

Project Title:

Remote Sensing of Resource Data on Southeastern Montana Rangelands

Project Supervisor:

John E. Taylor
Department of Animal and Range Sciences
Montana State University
Bozeman, Montana 59715
(406) 994-3721

Time Frame:

5/15/75 to 4/30/76

00000180

Project Title:

Remote Sensing Resources Project

Investigator:

Larry Reddin
Ashland
Montana

Project Supervisor:

Scott Fisher
Montana Department of Natural Resources & Conservation
32 S. Ewing
Helena, Montana 59601
(406) 449-3780

Time Frame:

4/30/75 to 10/7/76

00000224

Project Title:

Development of Premining and Reclamation Plan Rationale (J0255002)

Investigator:

Lloyd Brown; Gerald Place
605 Parfet Street
Denver, Colorado 80215
(303) 232-6262

Project Supervisor

Al D. Pernichele
Dames & Moore
7101 Wisconsin Avenue
Washington, D.C. 20014

Time Frame:

6/24/75 to 6/24/78

00000277

Project Title:

Demonstration of a Digitizing and Compositing Program for Natural Resource Data

Project Supervisor:

R. Thomas Dundas
Department of Community Affairs
Capitol Station
Helena, Montana 59601
(406) 449-2896

Time Frame:

6/23/75 to 6/30/76

00000309

Project Title:

Soil Microbiological Studies on the Reclamation of Coal Surface Mine Spoils in Eastern Montana

Investigators:

Kenneth Temple; Larry Hersmann
Department of Microbiology
Montana State University
Bozeman, Montana 59715
R. L. Hodder
Montana State University
Bozeman, Montana 59715

Project Supervisor:

Edward J. Depuit
Agricultural Experiment Station
Department of Animal and Range Sciences
Montana State University
Bozeman, Montana 59715

Time Frame:

7/1/75 to 6/30/76

00000312

Project Title:

Energy Related Graduate Traineeship Program

Project Supervisor:

Henry Parsons, Assistant
College of Graduate Studies
Montana State University
Bozeman, Montana 59715

Time Frame:

9/1/74 to 8/31/77

00000313

Project Title:

Plant and Soils Reclamation Research on Strip Mined Lands

Investigator:

Douglas J. Dollhopf

Project Supervisor:

Richard L. Hodder
Montana State University
Bozeman, Montana 59715

Time Frame:

7/1/75 to 6/30/76

00000314

Project Title:

Effects of Coal Strip Mining on Vegetation and Soil Water Relationship

Investigator:

Douglas J. Dollhopf

Project Supervisor:

Richard Hodder
Montana State University
Bozeman, Montana 59715

Time Frame:

7/1/75 to 6/30/76

00000410

Project Title:

Bear Creek, Montana Reclamation Study Site

Investigator:

Richard Hadley

Project Supervisor:

U.S.G.S.
Lakewood, Colorado 80225

Time Frame:

7/1/75 to 7/1/76

00000413

Project Title:

Otter Creek East Reclamation Site-Overburden Investigation

Investigator:

H. P. Dupree

U.S. Bureau of Reclamation

P.O. Box 2553

Billings, Montana 59103

Project Supervisor:

Fred Waldhaus

U.S. Bureau of Land Management

P.O. Box 30157

Billings, Montana 59107

Time Frame:

4/22/76 to 5/1/77

00000414

Project Title:

Dam Creek Reclamation Site - Overburden Investigation

Investigator:

H. P. Dupree

U.S. Bureau of Reclamation

P.O. Box 2553

Billings, Montana 59103

Project Supervisor:

Fred Waldhaus

U.S. Bureau of Land Management

P.O. Box 30157

Billings, Montana 59107

Time Frame:

4/22/76 to 5/1/77

Project Title:

Chemistry and Soil-Water-Plant Relationships of Disturbed Lands and Their Effects on Revegetation

Investigator:

U.S. Department of Agricultural Research Service

Time Frame:

10/ /75 to 10/ /80

Descriptive Abstract:

This study addresses the problem of rehabilitation of many of the potentially disturbed soils in Montana as a result of future coal strip mining operations. It hopes to develop methods of land surface modification to enhance snow accumulation and reduce surface runoff.

Project Title:

Evaluate the Process and Constraints of Federal Land Use Planning in Energy Impacted Areas

Investigator:

Stephen James
Woodward-Clyde Associates
San Francisco, California

Time Frame:

1/ /76 to 10/ /76

Descriptive Abstract:

(1) A review of the land use plan developed by the Bureau of Land Management and the Forest Service in cooperation with the State of Montana for the Decker-Birney planning unit; (2) Evaluation and documentation of the degree of compatibility and consistency of land use guidelines with federal/state environmental legislation and regulations; (3) Analysis of the multi-jurisdictional situation and constraints; (4) Documentation of the process of guideline implementation; (5) Identification of the mechanisms available to enforce guidelines implementation policies to ensure the maintenance or enhancement of environmental quality; (6) Where and if necessary, development of recommendations to improve the guidelines and implementation policies to ensure the maintenance or enhancement or environmental quality; (7) Recommendation of a system to monitor the environmental impacts, including socio-economic aspects of plant implementation.

OIL, GAS, ELECTRICITY & URANIUM

Project Title:

Test of Oil "Wash" Method, Bell Creek Fields, Montana

Investigator:

Ron Branish
Gary Operating Company
Englewood, Colorado

Time Frame:

8/ /76 to Continuing

Descriptive Abstract:

The pilot program at the Bell Creek fields in Southeastern Montana calls for four new wells to be drilled to inject the chemical-water mixture called Micellar-Polymer in an effort to break loose underground oil that would be produced from nine existing wells. An additional 320,000 barrels of oil is expected from this test area that has almost stopped producing oil despite ordinary water-injection procedures.

Project Title:

Uranium Water & Sediment Geochemistry of Boulder Batholith, Western Montana

Investigator:

Arnold Silverman
Ian Lange
Department of Geology
University of Montana
Missoula, Montana 59801

Time Frame:

5/1/76 to 8/1/76

Descriptive Abstract:

Sampling of water and stream sediments for uranium in the area between Helena and Butte, Montana (Boulder Batholith). Geology Department will collect samples and analysis will be conducted at Los Alamos Lab.

Project Title:

Western Energy Expansion Study

Investigator:

Jim Davies
Power Division
U.S. Department of the Interior
Bureau of Reclamation
Billings, Montana 59103

Time Frame:

2/ /76 to 5/ /77

Descriptive Abstract:

This study will inventory and compare opportunities to increase energy capacity and generation through water management and development. The following purposes will be explored: (1) use of federal project water for cooling thermal power plants; (2) revision of water and power operations at existing facilities to minimize power needs for pumping or to maximize power generation, including the purchase of power to meet federal pumping requirements, thus freeing federal hydropower for peaking purposes; (3) energy conservation measures by federal power facilities; (5) identification of new

hydro and pumped storage sites; (6) appraisal of secondary uses of thermal cooling product water such as warm water irrigation; (7) use of waste water for thermal cooling; (8) prior utilization of known hydropower generating potentials for possible updated feasibility study authorizations; (9) improvement of power transmission through consolidation of lines, exploration of joint ventures with private industry, and impacts of new technology on interties and (10) consideration of integrating "exotic" forms of energy such as mineral energy, geothermal, solar and wind and hydropower generation for use in and around major western load centers. The study will be an interregional coordinated effort to compare potential energy development projects.

Project Title:

Missouri River: North Dakota, South Dakota, Nebraska and Montana

Investigator:

Army Corps of Engineers

Time Frame:

/ / to 2/ /77

Descriptive Abstract:

This study in the Upper Missouri River Basin deals with overall water resources problems and the opportunities for including hydro electric power generation at existing facilities. Additional units may be possible that would increase capacities at three of the six existing projects on the Upper Missouri River. This study is evaluating the optimum size of additional units, the economic feasibility and the environmental and social impacts. The Omaha District will publish a report on the feasibility of increasing the size of existing units at the Fort Peck, Montana, project and other existing dams in the main stem system, addition of new dam sites between Fort Peck Dam and Lake Sakakawea, and development of pump-storage power plants between certain upland and main stem lakes.

Project Title:

Montana Energy Data Project

Investigator:

Terry Wheeling

Montana Energy Advisory Council

State Capitol

Helena, Montana 59601

Time Frame:

1/ /76 to 9/ /76

Descriptive Abstract:

This project will assemble and assess Montana energy data and input this data into an automated data storage and retrieval system. Data will be collected primarily from published reports of state agencies (Department of Revenue, Oil and Gas Commission, Public Service Commission), federal agencies (Bureau of Mines, Federal Power Commission, Federal Highway Administration, Federal Energy Administration) and energy-related trade journals (Edison Electric Institute, American Gas Association, Coal Age, Ethyl Corporation). The primary objectives of the project will be to:

(1) Make the data more readily available to state agencies and researchers involved in Montana energy supply/demand studies; (2) Enable verification of this data between the various sources; (3) Provide a flexible interface with available automated Montana demographic and economic data; and (4) Enable simple updating (as well as possible expansion) of the data set.

Project Title:

Distillation Project

Investigator:

Lloyd Berg
Chemical Engineering Department
Montana State University
Bozeman, Montana 59715

Time Frame:

7/1/73 to 6/30/76

Descriptive Abstract:

An investigation of the separation of ethyl benzene from p-xylene and m-xylene by means of extractive distillation.

POPULATION / DEMOGRAPHIC

Project Title:

Montana Futures Process

Investigator:

Gordon Hoven

Department of Community Affairs

Capitol Station

Helena, Montana 59601

Time Frame:

9/1/75 to 8/30/76

Descriptive Abstract:

A computer simulation routine designed to serve as a quantitative tool in the appraisal of the economic and demographic impacts of a wide range of possible economic developments. The system is capable of analyzing both the long-run growth prospects of substate regions, as well as the employment, population, and income effects of a change in activity within 35 industrial sectors. Present use of the technique has centered on analysis of energy-related growth.

RESOURCE ALLOCATION

RESOURCE ALLOCATION

00000330

Project Title:

Estimation of Amenity Values as Opportunity Costs for Energy-Related
Water Use in Montana

Project Supervisor:

Richard L. Stroup
Department of Agricultural Economics and Economics
Montana State University
Bozeman, Montana 59715

Time Frame:

3/1/75 to 3/31/76

00000363

Project Title:

Yellowstone River Basin and Adjacent Coal Area Level 'B' Analysis

Project Supervisor:

Jerry W. Knapp, Study Manager
Harza Engineering Company
150 South Wacker Drive
Chicago, Illinois 60606

Time Frame:

1/19/76 to 6/9/76

Project Title:

The National Center for Appropriate Technology

Investigator:

Cecil Cook

Eugene Eccli

National Center for Appropriate Technology (and)

Montana Energy and MHD Research and Development Institute

Butte, Montana 59701

Time Frame:

3/ /76 to 6/ /76

Descriptive Abstract:

The National Center for Appropriate Technology is committed to the goal of assisting low income citizens to develop and sustain a humanly satisfying existence. The center will concentrate on research and demonstration projects and assistance to lower income communities so they can develop resource efficient components and patterns in the following general areas:

(1) low cost, energy efficient housing; (2) agricultural systems and food; (3) general health and nutrition; (4) energy conservation and decentralized energy production systems; and (5) regional economics and community development.

Project Title:

Method of Grain Production Comparing Minimum Tillage, No Tillage, Chemical Fallow and Tillage Fallow

Investigator:

Arthur L. Dubbs

Central Agriculture Research Center

Moccasin, Montana 59462

Time Frame:

1/1/75 to 1/1/83

Descriptive Abstract:

To test various crop rotations with minimum tillage. To test the use of herbicides as a fallow method instead of tillage. This will also conserve moisture and eliminate or greatly reduce soil erosion (each time fallow is tilled, moisture is lost and more stubble is broken down and buried in the soil). Soil tests will be taken to determine fertility use and requirements. Weed population will be studied and methods of control. Fuel savings will be determined each year.

SOCIOLOGICAL STUDIES

SOCIOLOGICAL STUDIES

00000357

Project Title:

Decker-Birney Socio-Economic Study

Investigator

Patrick C. Jobes

Department of Sociology

Montana State University

Bozeman, Montana 59715

Project Supervisor:

Montana State University

Time Frame:

7/1/74 to 7/30/76

00000388

Project Title:

Bridging Resource and Social Variables: A Project to Learn How to Plan for and Manage 'People Problems' Associated With Resource-Related Development

Project Supervisor:

Raymond L. Gold, Director

Institute for Social Science Research

University of Montana

Missoula, Montana 59801

Time Frame:

9/1/75 to 6/30/76

00000470

Project Title:

Longitudinal Socioeconomic Monitoring System

Investigator:

Audie L. Blevins, Jr.

University of Wyoming

Department of Sociology

Laramie, Wyoming 82071

Project Supervisor:

Gary Watts

University of Wyoming

Division of Business and Economic Research

Laramie, Wyoming 82071

Time Frame:

11/1/75 to 10/31/77

00000475

Project Title:

The Socioeconomic Impact of Energy Development of the Crow and
Northern Cheyenne Indian Tribes

Investigators:

Jean Nordstrum
Northern Cheyenne Research Program

Martin Baker
Crow Office of Coal Research
Crow Agency, Montana

Project Supervisor:

Richard Monteau
Northern Cheyenne Research Project
Lame Deer, Montana 59043

Time Frame:

5/1/76 to 4/30/77

Project Title:

Health Impacts of Environmental Pollution in Energy Development Impacted
Communities

Investigator:

Mike Manner
Dr. Melvin Goodwin
Copley International
LaJolla, California

Time Frame:

1/ /76 to 3/ /77

Descriptive Abstract:

An evaluation will be received of public health problems due to stress on public utilities and services, e.g., communicable diseases, infant mortality and accidents due to inadequate solid waste management, poor drinking water, fugitive dust from construction and increased traffic on unpaved roads. This information will be used to help prevent and solve public health problems.

WATER QUALITY

WATER QUALITY

00000094

Project Title:

Potential Impacts to Ground-Water and Surface-Water Quality and
Quantity From Proposed Energy Development on the Northern Cheyenne
Reservation, Montana

Investigator

William W. Woessner, Hydrogeologist
Northern Cheyenne Research Project
Box 248
Busby, Montana 59016

Project Supervisor:

Northern Cheyenne Tribe

Time Frame:

6/1/75 to 8/31/78

00000113

Project Title:

Water Quality Effects of Coal Developments on the Tongue River Reservoirs

Investigator:

Jerry Keiser
Montana Water Quality Bureau
Billings, Montana 59101
(406) 252-5697

Project Supervisor:

Max Botz
Montana Water Quality Bureau
Helena, Montana 59601
(406) 449-2406

Time Frame:

7/1/75 to 6/1/76

00000114

Project Title:

Water Quality Effects of Canadian Coal Development on the East Poplar
River, Montana

Investigator:

Jerry Keiser
Montana Water Quality Bureau
Billings, Montana 59101
(406) 252-5697

Project Supervisor:

Max Botz
Montana Water Quality Bureau
Capitol Station
Helena, Montana 59601
(406) 449-2406

Time Frame: 7/1/75 to 6/30/76

00000120

Project Title:

Study and Monitoring of Fort Union Basin -- Water Quality

Project Supervisor:

Don Willems

Department of Health and Environmental Sciences

Cogswell Building

Helena, Montana 59601

Time Frame:

6/1/75 to 7/1/76

00000123

Project Title:

Ground Water Analyses

Project Supervisor:

George Pike

U.S. Geological Survey

Water Resources Division

Helena, Montana 59601

Time Frame:

6/30/75 to 6/30/76

00000158

Project Title:

Water Quality and Biological Monitoring Program for Energy Resource
Areas - Montana

Investigator:

U.S. Geological Survey

Helena, Montana 59601

Time Frame:

4/1/75 to 4/1/77

00000308

Project Title:

Effects of Surface Configuration in Water Pollution Control on Semi-Arid
Mined Lands

Investigators:

Wayne VanVoast

Montana Bureau of Mines and Geology

I. B. Jensen

Montana State University

Bozeman, Montana 59715

Project Supervisor:

R. L. Hodder

Montana State University

Bozeman, Montana 59715

Time Frame:

5/1/74 to 5/1/78

00000332

Project Title:

Limnology of the Tongue River Reservoir; Existing and Potential Effects
of Coal Strip Mining

Project Supervisor:

Richard W. Gregory
Biology Department
Montana State University
Bozeman, Montana 59715

Time Frame:

4/1/75 to 6/30/79

00000333

Project Title:

Yellowstone-Tongue Water Quality Management Project

Investigators:

Clark Judy; Carol Harlow; Ambrey Gartner

Project Supervisor:

Floyd Irion, Chairman
Yellowstone-Tongue APO
Broadus, Montana 59317

Time Frame:

7/15/75 to 8/15/77

00000418

Project Title:

A Model for Predicting Ion Concentration in the Yellowstone River
Basin Between Miles City and Billings, Montana: A Management Tool
(M.S. Thesis-U.S. EPA Fellowship)

Investigator:

Richard W. Karp

Project Supervisor:

Donald Boyd
Montana State University
Bozeman, Montana 59715

Time Frame:

9/22/75 to 9/21/76

000000424

Project Title:

Water Resources Aspects of Coal Transportation by Slurry Pipeline

Project Supervisor:

J. Moore, Director
University of Arkansas
Water Resources Research Center
University Hall
Fayetteville, Arkansas 72701

Time Frame:

7/1/75 to 6/1/76

00000425

Project Title:

Ground Water Quality Study

Investigators:

Marvin Miller
Montana Bureau of Mines and Geology
Room 2038, Main Hall
Butte, Montana 59701

Willard Owens
Willard Owens Associates
7391 W. 38th Avenue
Wheatridge, Colorado 80033

Judy Clark
Box 503
Broadus, Montana 59317

Time Frame:

1/1/76 to 12/31/76

00000431

Project Title:

Northern Cheyenne Water Quality Project

Investigator:

William W. Woessner
Northern Cheyenne Research Project
Lame Deer, Montana

Project Supervisor:

Judy Clark
Yellowstone-Tongue APO
Box 503
Broadus, Montana 59317

Time Frame:

4/1/76 to 8/31/77

00000432

Project Title:

Nonpoint Source Water Quality Management

Investigators:

Ray Choriki
Montana Testing Laboratory
711 Third Street N.W.
Great Falls, Montana 59404

Dana Schmidt
Olson-Elliott & Associates
349 Last Chance Gulch
Helena, Montana 59601

Project Supervisor:

Judy Clark
Yellowstone-Tongue APO
P.O. Box 503
Broadus, Montana 59317

Time Frame:

5/1/76 to 4/30/77

00000439

Project Title:

Mid-Yellowstone Water Quality Management Project (EPA 208)

Project Supervisor:

Allen Bond, Director
Mid-Yellowstone Areawide Planning Organization
330 Second Avenue N.
Suite 2
Billings, Montana 59101

Time Frame:

1/1/76 to 12/30/77

Project Title:

Flathead Drainage 208 Project

Investigator:

Peter Vance

Flathead Areawide Planning Organization

Time Frame:

4/ /75 to 1/ /78

Descriptive Abstract:

The study area includes Flathead and Lake Counties, the North Fork and South Fork of the Flathead River, Flathead Lake and numerous other streams and lakes. Eight major studies will be conducted with one directly energy related. The North Fork Flathead Study will collect baseline data on the North Fork. With impending coal mining in the Canadian headwaters of the North Fork, this study will be helpful in identifying any future pollution sources. Oil and gas exploration and extraction is also a possibility in the North Fork area.

WATER USE / SUPPLY

WATER USE/SUPPLY

00000059

Project Title:
Hydrologic Characteristics of Mine Spoils
Project Supervisor:
Wayne VanVoast, Hydrologist
Montana Bureau of Mines and Geology
Butte, Montana 59701
Time Frame:
6/16/75 to 6/30/77

00000086

Project Title:
Evaluation of Potential Physical, Biological and Water Use Impacts of
Water Withdrawals and Water Development on the Middle and Lower Por-
tions of the Yellowstone River Drainage in the State of Montana
Investigator:
Robert Anderson
(406) 449-2872
Project Supervisor:
Gary Wicks, Director
Montana Department of Natural Resources and Conservation
32 S. Ewing
Helena, Montana 59601
(406) 449-2872
Time Frame:
6/25/74 to 6/30/76

00000100

Project Title:
Effects of Mining and Related Activities on the Shallow Ground-Water
System
Investigator:
Robert S. Roberts
Project Supervisor:
George M. Pike, District Chief
U.S. Geological Survey
Water Resource Division
P.O. Box 1696
421 Federal Building
316 N. Park
Helena, Montana 59601
(404) 442-9040
Time Frame:
7/1/74 to 6/1/79

000000104

Project Title:

Availability of Groundwater From Aquifers in the Cretaceous and
Tertiary Systems in the Fort Union Coal Region

Investigator:

Mack G. Croft

Project Supervisor:

Walter R. Scott, District Chief
U.S. Geological Survey
Water Resources Division
P.O. Box 778
Room 332, New Federal Building
Third Street and Rosser Avenue
Bismarck, North Dakota 58501

Time Frame:

7/1/74 to 6/1/76

00000122

Project Title:

A Cooperative Program to Evaluate Surface and Ground Water Problems
Associated With Potential Strip Mine Sites -- A Joint Effort of Montana
State University, Montana College of Mineral Science & Technology,
University of Wyoming, North Dakota State University and University of
North Dakota

Investigators:

R. Koob; P. Rechard

Project Supervisor:

Theodore T. Williams
Department of Civil Engineering and Mechanics
Montana State University
Bozeman, Montana 59715

Time Frame:

7/1/75 to 7/1/78

00000124

Project Title:

Level B Water and Related Land Resources Study of the Yellowstone River
Basin and Adjacent Coal Areas in the States of Montana, Wyoming, North
Dakota and South Dakota

Investigator:

Robert Madsen
Transwestern Life Building
Billings, Montana 59101

Project Supervisor:

Keith H. Corrigan
Montana Department of Natural Resources and Conservation
32 S. Ewing
Helena, Montana 59601

Time Frame:

6/16/75 to 11/30/76

00000125

Project Title:

Collection of Surface-Water, Ground-Water and Quality of Water Data
in Southeastern Montana

Project Supervisor:

George M. Pike
U.S. Geological Survey
Water Resources Division
P.O. Box 1696
Helena, Montana 59601
(406) 449-5263

Time Frame:

7/1/73 to Continuing

00000322

Project Title:

Study of Possible Effects of Strip Coal Mining on the Hydrologic System
in Eastern Montana

Project Supervisor:

Wayne VanVoast
Montana Bureau of Mines and Geology
Room 111 - Sixth Avenue Plaza
3021 Sixth Avenue N.
Billings, Montana 59101

Time Frame:

6/30/73 to 6/30/76

00000324

Project Title:

Hydrology of Western Energy Company's Probable Mine Areas

Project Supervisor:

Wayne VanVoast
Montana Bureau of Mines and Geology
Room 111 - Sixth Avenue Plaza
3021 Sixth Avenue N.
Billings, Montana 59101

Time Frame:

6/30/73 to 6/30/76

00000326

Project Title:

Groundwater Problems Associated with Potential Strip Mine Sites

Investigators:

G. K. Pagenkopf; P. W. Jennings
Montana State University
Bozeman, Montana 59715

Project Supervisor:

Wayne VanVoast
Montana Bureau of Mines & Geology
Room 111, Sixth Avenue Plaza
3021 Sixth Avenue N.
Billings, Montana 59101

Time Frame:

6/1/74 to 5/1/78

00000328

Project Title:

Mining Related Hydrologic Evaluations Near the Big Sky Mine, South-
Eastern Montana

Project Supervisor:

Wayne VanVoast
Montana Bureau of Mines & Geology
Room 111, Sixth Avenue Plaza
3021 Sixth Avenue N.
Billings, Montana 59101

Time Frame:

3/10/75 to 6/30/76

00000329

Project Title:

Premining Hydrologic Evaluations in the Southern Part of The Crow Indian
Reservation, Southeastern Montana

Project Supervisor:

Wayne VanVoast
Montana Bureau of Mines and Geology
Room 111, Sixth Avenue N.
Billings, Montana 59101

Time Frame:

10/1/74 to 6/30/76

00000337

Project Title:

Hydrologic Effects of Surface Mining, Land Rehabilitation and Land
Use as Defined by Rainfall Simulation

Investigator:

Gregg C. Lusby

Project Supervisor:

Richard F. Hadley
U.S. Geological Survey
Water Resources Division
Box 25046, Denver Federal Center
Stop 412
Denver, Colorado 80225

Time Frame:

7/1/73 to 6/30/76

00000420

Project Title:

Evaluation and Monitoring of the Hydrologic Impact of Cabin Creek,
B.C., Coal Pit Mining Upon the North Fork of the Flathead River

Project Supervisor:

W. Mark Weber
University of Montana
School of Forestry
Missoula, Montana 59801

Time Frame:

7/1/75 to 6/30/76

00000423

Project Title:

Investigations of the Implications of Yellowstone River Flow Reservation
in Montana

Investigator:

Harold Boeker
U.S. Fish and Wildlife Service

Project Supervisor/Institution:

U.S. Fish and Wildlife Service

Time Frame:

6/23/75 to 6/30/78

00000429

Project Title:

Vigil Network Establishment for Eastern Montana Coal Fields

Investigators:

W. M. Weber; R. R. Curry

Project Supervisor/Institution:

University of Montana

Department of Geology

Missoula, Montana 59801

Time Frame:

10/1/74 to 6/30/76

00000440

Project Title:

Water Conservation on Rangelands and Mine Spoils of the Northern Plains

Investigators:

Gerald Schuman, Gene Howard

U.S. Agricultural Research Service

Route 1, Box 698

Cheyenne, Wyoming 82001

Project Supervisor:

Frank Rauzi

U.S. Agricultural Research Service

University of Wyoming

Laramie, Wyoming 82071

Time Frame:

8/18/70 to 9/12/76

Project Title:

Channel Changes in the Powder River (Project CR75-102)

Investigator:

Robert H. Meade
Lakewood, Colorado

Time Frame:

/ / to Continuing

Descriptive Abstract:

After it leaves the Big Horn Mountains, the Powder River flows in an alluvial channel. Like other alluvial channels, that of the Powder River is constantly shifting by erosion, lateral accretion, and occasional cutting off of bends. As of now, the channel of the Powder River and the rates at which it shifts have been affected very little by human activities. Rates of channel migration will be measured in the 170 kilometer reach of the Powder River between Arvada, Wyoming, and Broadus, Montana. This reach was selected because sediment loads are sampled daily at Arvada, at Moorhead and at Broadus. Another reason for the selection of this reach is that it contains the site of a proposed reservoir to store water for energy development. If the reservoir is built, its effects on the river channel can be assessed from the available data. Fieldwork conducted to date has been on the river below Moorhead. It consisted of surveying and marking cross-sections of the river that will be resurveyed in subsequent years to measure the rates at which the channel shifts.

Project Title:

Chemical and Physical Characteristics of Inflow to the Tongue River in Montana (Project MT75-054)

Investigator:

U.S. Geological Survey
Helena, Montana 59601

Time Frame:

/ / to Continuing

Descriptive Abstract:

During November 1975, the Tongue River Dam was closed for repairs and the discharge of the river was reduced to near-record low flow. Discharge of the stream was mainly from water in the valley alluvium and from aquifers in the coal-rich Fort Union Formation. Data collected from the project will be used to determine the amount and quality of groundwater discharge to the Tongue River between the dam, which is near the Wyoming-Montana boundary, and the mouth of the river at Miles City. Stream discharge and quality will be correlated with aquifers along the stream with the aid of aerial infrared (thermal) photography and water levels in wells. Data will then be used to refine predictive techniques of estimating the potential impacts of energy-fuels development on the hydrologic regime of the Tongue River Valley and similar valleys. This study is a sub-project of "Effects of Mining and Related Activities on the Shallow Ground Water System".

Project Title:

Feasibility of an Hydroelectric Power Plant on the Kootenai River Near
Troy, Montana

Investigator:

Jonothan Dueker
Beak Consultants
Loyalty Building
317 S.W. Alder
Portland, Oregon

Time Frame:

12/ /75 to 12/ /78

Descriptive Abstract:

This three-year feasibility study will look at impacts on natural resources and values, fish and wildlife resources and engineering feasibility. If constructed, the plant would provide an estimated annual generation of 500 million kilowatt hours of electricity.

Project Title:

Hydrology of the Madison Limestone and Associated Rocks in Parts of Montana, Nebraska, North Dakota, South Dakota and Wyoming

Investigator:

William R. Miller
Elliott M. Cushing
Lakewood, Colorado

Time Frame:

7/1/72 to Continuing

Descriptive Abstract:

Major development of coal within the area will place a heavy demand on the area's limited water resources. Surface water is poorly distributed in time and space. It is fully appropriated in part of the area, and in the rest its use will require storage reservoirs and distribution systems. Preliminary studies indicate that the Madison Limestone (Madison Group) and associated rocks might provide significant percentage of the total water requirements for coal development. However, the effects of large sustained withdrawals of water from these rocks on the hydrologic system are not known. The objectives of the five-year hydrologic study of the Madison Limestone and associated rocks are to evaluate the quantity of water that may be available from the Madison; define the chemical and physical properties of the water; determine the effects of existing developments on potentiometric head, storage, recharge and discharge, spring flow and stream flow, and pattern of ground-water flow; predict the possible hydrologic effects of proposed withdrawals of water for large-scale developments at selected rates and locations; determine the optimum locations for wells and the type of construction and development of deep wells to obtain maximum yeilds; and design a network of observation wells and stream flow gages to monitor effects of additional developments on the hydrologic system.

Project Title:

Northwest Regional Assessment of Energy Resources Including Water Resources
in Coal Fields of Wyoming and Montana

Investigator:

J. W. Currie
Senior Research Economist
Battelle Northwest Laboratories
Battelle Boulevard
Richland, Washington 99352

Time Frame:

/ / to Continuing

Descriptive Abstract:

This report is presently underway and will be ongoing for several years. Its purpose is to determine the effect of potential energy development on environment, health and social life. The part of the report concerned with coal is being done in cooperation with other laboratories and together they are working on the long-term development of coal. The region included is Washington, Oregon, Idaho, Montana, Wyoming and Alaska. An annual progress report was to be completed sometime in January 1976.

Project Title:

Regionwide Evaluation of Available Hydrologic Data Water Resource Considerations for the Proposed Eastern Montana Coal Development

Investigator:

Robert Curry
Associate Professor
Department of Geology
University of Montana
Missoula, Montana 59801

Time Frame:

5/1/75 to 4/30/76

Descriptive Abstract:

This proposal will collect all available surface water streamflow quality records from the Northern Great Plains coal region and adjacent areas of Alberta and Saskatchewan. These data are to be analyzed on a regional scale with considerations being given to interbasin and groundwater to surface-water transfers to assess: (1) what we presently know about water quantity on the Northern Great Plains; (2) what additional information we need to know to establish adequate baseline data networks and to assess availability of demanded water, and (3) how the various proposed coal resource and allied developments will impact the available water and how the availabilities of such waters will partly control the developments. A final objective of this study will be to develop regionwide data to provide input to, and interpolate between, the areas of more intensive and extensive hydrologic analysis.

